



**NOAA Fisheries**



**National Marine Fisheries Service**

**NORTHEAST REGION**

## **CURRENT BYCATCH PRIORITIES AND IMPLEMENTATION PLAN**



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This is a public, working document that will be revised in the future as additional bycatch minimization opportunities occur.

September 27, 2004 (draft)

## **Northeast Region Current Bycatch Priorities and Implementation Plan - Summary**

This is a public, working document that will be revised in the future as additional bycatch minimization opportunities occur.

### **Monitoring**

#### *Priorities for FY05/FY06:*

- Explore the use of video monitoring systems
- Improve training and retention of at-sea observers
- Provide vessel owners with observer data
- Conduct database review to identify additional existing data sources (if funded)
- Improve quantitative estimates of bycatch by gear and fishery
- Increase observer coverage to address regional priorities
- Incorporate review of quantitative estimates of bycatch into SAW process
- Pay for sea days to supplement existing data (if funded)

#### *FY04 Priorities Accomplished:*

- Increase observer coverage to address regional priorities

### **Research**

#### *Priorities for FY05/FY06:*

- Gear modifications to reduce bycatch in regional priority fisheries
- Study of animal behavior as it relates to development of gear to reduce bycatch in regional priority fisheries
- Improve habitat and ecosystem information relevant to bycatch
- Establish centralized data repository
- Establish long-term research funding program; streamline exempted fishery permit process
- Utilize data provided by the fishing sector
- Participate in URI Sea Grant project to establish a regional gear engineering working group

#### *FY04 Priorities Accomplished:*

- URI Sea Grant Gear Engineering Working Group held a workshop for regional gear engineers on the design and analysis of gear selectivity experiments

## **Management**

### *Priorities for FY05/FY06:*

- Improve data available to the management process so that it can effectively address bycatch
- Work with Councils and Commission to consider management alternatives that provide incentive to reduce bycatch within planned management actions
- Evaluate the relation of excess fishing capacity to bycatch
- Establish Council bycatch committees
- Include individuals on Council working groups (PDTs etc.) with gear expertise
- Establish a peer review process for gear research proposals and results
- Evaluate possibility of using daily vessel reports to identify bycatch hotspots
- Work with Councils and Commission to address bycatch in planned management actions, implementing bycatch management measures when appropriate, including measures that utilize results of recent or ongoing research

### *FY04 Priorities Accomplished:*

- Worked with the Councils and Commission to ensure that bycatch was addressed in management actions completed in FY04

## **Education/Outreach**

### *Priorities for FY05/FY06:*

- Improve NEFSC communication with constituents concerning Observer Program
- Improve NERO communication with constituents concerning use of bycatch estimates in management
- Establish positions of Bycatch Outreach Specialist and Bycatch Gear Specialist (NERO) to work with regional partners and constituents on bycatch issues, including working directly with other gear researchers on technical solutions (if funded)
- Establish Annual Bycatch forum to allow members of the gear engineering working group, other researchers, industry members and constituents to share information about recent bycatch research and identify potential avenues for future activities (if funded)

### *FY04 Priorities Accomplished:*

- Hold Regional Bycatch Workshop in June 2004 to review bycatch issues, and refine priorities and objectives with participation by ~200 constituents
- Hire NERO Outreach Coordinator to conduct outreach, including bycatch-related outreach activities
- URI Sea Grant Gear Engineering Working Group sponsored industry attendees at Bycatch Workshop and established a website with information about gear engineering

## INTRODUCTION

The Northeast Region's Regional Bycatch Plan provides an outline of activities that will be undertaken by the entities involved in fisheries management in the region to better understand and address bycatch issues. As noted in the initial plan (November 2003), it was cooperatively developed by these entities, and is to be revised periodically as new information becomes available or as additional bycatch minimization opportunities arise. The regional bycatch workshop, "Bycatch in Northeast Fisheries: Moving Forward," held from June 29 - July 1, 2004, in Wakefield, Massachusetts, served as the venue for new information to be developed and incorporated into this plan.

The Bycatch Workshop provided an opportunity for constituents to share ideas about developing improved measures to reduce or eliminate bycatch of both fish and protected species. Participants discussed and recommended priorities and solutions, with the discussion occurring in four working sessions. These sessions focussed on topics in four areas, and included a moderated discussion by the members of a panel of experts, and facilitated working sessions in the afternoon involving the panelists and members of the public in attendance.

The Moderators and panel members of the working sessions are shown below. The ideas generated by these working sessions have been used to produce this draft update of the Regional Bycatch Plan. The recommendations that were developed in each working session have been incorporated into the existing plan format, which presents suggestions under the headings of Monitoring, Research, Management, and Education/Outreach. The suggestions generated at the Bycatch Workshop are all attributed to the session(s) that generated them. Therefore, it is necessary to review the full document to locate all of the suggestions that were generated by each working session.

The NOAA Fisheries Regional Administrator, Patricia Kurkul, provided a brief summary of some common themes that ran through the four sessions at the Bycatch Workshop. Her remarks are provided below because they highlight some themes that came up throughout all four of the working sessions:

As I listened I identified some common themes that ran through the four sessions. The first is the theme of outreach, communication and training. There have been a lot of comments about the need for such activities, and specific suggestions came out of the working sessions. A number of people have noted that communication has to be a two-way process, and have identified the benefits of face-to-face meetings. This Workshop was a first step in establishing this sort of communication, and we need to have more activities like this in the future. As we move forward and improve communication concerning bycatch concerns, we need to involve the full range of interested constituents. We shouldn't communicate just for the sake of saying we did, but need to build trust and partnerships between and among the various groups concerned about the issue of bycatch.

A specific aspect of communication that was noted in several of the sessions was the need to integrate bycatch activities undertaken by the various people and programs working on bycatch issues. There are common threads between finfish management programs and protected species programs, and both the programs and the individuals involved in these two areas need to interact. There are similar interrelationships between various data collection programs and research activities. This need to integrate activities extends into the international arena as well. U.S. programs and researchers need to build on work being carried out in other nations so that we can each learn from one another's successes and avoid one another's pitfalls.

The second recurring theme I heard at this workshop is that there is strong support for cooperative research programs. Specific research areas were mentioned by various people including the need to further use both video and VMS technologies, study fleets and other data collection methods. In addition, there was considerable discussion of the need to develop incentives relating to bycatch. These discussions revealed how challenging it can be to design management programs that provide positive incentives to reduce bycatch. It was noted that some management programs inadvertently create disincentives to reduce bycatch.

Finally, it appears that all of us recognize the bycatch problem generally, and can identify some successes in addressing bycatch issues. However, there also appears to be a general acceptance of the fact that, as stocks improve, the challenges will increase. So I'd like to view this workshop as the beginning of a process, not the end.

## **DATA AND MONITORING**

Moderator	Maury Osborn, ACCSP
Panel	Susan Wigley, NEFSC
	David Potter, NEFSC
	Marjorie Rossman, NEFSC
	Greg Power, NERO
	Bill Lee, Massachusetts
	Tony Bogan, New Jersey
	Beth Babcock, Pew Institute for Ocean Science

## **SCIENCE AND RESEARCH**

Moderator	Dr. Chris Glass, Manomet
Panel	Dr. Paul Rago, NEFSC
	Dr. Richard Merrick, NEFSC
	Don Perkins, Maine Aquarium
	Frank Mirachi, Massachusetts
	Danny Cohen, New Jersey
	Ken Hinman, National Coalition for Marine Conservation

## **MANAGEMENT**

Moderator Vince O'Shea, ASMFC  
Panel Dr. Ralph Mayo, NEFSC  
Mary Colligan, NERO  
Joel MacDonald, NOAA GC  
Paul Howard, NEFMC  
Dr. Chris Moore, MAFMC  
Sima Frierman, New York  
Bud Brown, Maine  
Gib Brogan, Oceana

## **GEAR TECHNOLOGY**

Moderator Arne Carr, Massachusetts Division of Marine Fisheries (retired)  
Thomas Moth-Poulsen, Massachusetts Division of Marine Fisheries  
Ron Smolowitz, Connamessett Farm  
Glenn Salvador, NERO  
Jim Lovgren, MAFMC member  
Frank Blount, NEFMC member  
Geoff Smith, Ocean Conservancy  
John Williamson, NEFMC Research Steering Committee

The initial regional plan was developed in 2003 by a Regional Bycatch Assessment Team (RBAT) composed of staff from the Northeast Regional Office (NERO), Northeast Fisheries Science Center (NEFSC), the New England and Mid-Atlantic Fishery Management Councils (Councils), the Atlantic States Marine Fisheries Commission (Commission), the Atlantic Coastal Cooperative Statistics Program (ACCSP), and Rhode Island Sea Grant (team members are listed in Appendix A). These partners are each involved in various aspects of the fisheries management process, and all are involved in activities to address bycatch. A smaller group was established to serve as the Coordinating Committee for the bycatch workshop (see Appendix A). Following the Bycatch Workshop, the Coordinating Committee worked with the session moderators to identify the action items developed in each working session, and to incorporate them into this update.

The Regional Bycatch Plan provides an outline that can be used as each of the partners involved in management in the region works to address various aspects of bycatch. In addition to being incorporated into management by these entities, it is hoped that the action items will be incorporated, as appropriate, into programs under the aegis of the Northeast Consortium and universities, including NOAA's Cooperative Marine Education and Research (CMER) programs.

This draft version of the updated regional bycatch plan will be publicly reviewed with the attendees at the New England Fishery Management Council, November 16-18, 2004, and Mid-Atlantic Fishery Management Council, December 7-9, 2004. The final version of the updated plan will be issued following the review of public comments.

## **BACKGROUND**

As noted in the initial Regional Bycatch Plan, the consideration of bycatch of fish, marine mammals, sea turtles, and sea birds is but one aspect of fisheries management that must be considered by fishing industry members, managers, scientists, and conservation advocates. While the Magnuson-Stevens Act (MSA) National Standard 9 requires that, “conservation and management measures shall, to the extent practicable (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch,” it further prescribes that these same measures shall comport with nine other national standards and several other required provisions of the MSA. Consequently, though bycatch can occasionally be considered as an independent issue, it more often is one of many interrelated issues for which the fishery management councils develop management solutions. Therefore, bycatch solutions must be integrated into the broader management program. Actions taken under the Marine Mammal Protection Act (MMPA) and Endangered Species Act (ESA) to reduce protected species interactions also have complex biological, environmental, and social effects. When such actions are integrated into management, they can have multiple benefits. For example, the month-long closure of an area to sink gillnet fishing may address the multiple aims of reducing fishing mortality in the multispecies fishery, eliminating the incidental take of harbor porpoise, and addressing conflicts between different fishing gear types.

Fishing restrictions can serve multiple purposes and have multiple impacts, and this point was made by many of the attendees at the Bycatch Workshop. Some measures can be developed and implemented that expressly reduce bycatch, such as the existing measures that established gear restricted areas to allow escapement of undersized scup or the measure that requires weak links in lobster pot gear to help whales breakaway when entangled. But approaches can also be outlined for use in the development of fishery management programs that will meet multiple objectives, including the reduction of bycatch. Appendix B provides an updated summary of existing management provisions related to bycatch. It identifies measures that directly address bycatch concerns, as well as others that are recognized as indirectly reducing bycatch, generally by controlling fishing effort. The indirect measures illustrate the interrelationship of bycatch to the broader management program.

Evaluations of bycatch have been done on a fishing gear basis, in analyses conducted under the MMPA and ESA, and in the recent report of the National Working Group on Bycatch, “Evaluating Bycatch: A National Approach to Standardized Bycatch Monitoring Programs.” The report, which identified high priority monitoring needs for ESA and MMPA species in the Northeast Region, was used as the basis of the recommendations for monitoring priorities in the initial Regional Bycatch Plan. This evaluation was done on a fishing gear basis, and while the report did not examine fish bycatch issues in sufficient detail to be used directly in setting regional priorities, the RBAT determined that it would be appropriate to use the ESA/MMPA priorities because they include many of the commercial fisheries in which fish bycatch is also a concern.

These priorities were not revised by the Bycatch Workshop activities and are still included in this plan. However, as noted in the initial plan, these gear-based evaluations are inconsistent with the underlying regulatory structure for fishery management, in which management plans are developed on a species/stock basis; as are stock assessments, management advice and the data that underpin them. Therefore, in order to enact measures to address bycatch, management action may be required to modify management plans under the authority of several management entities including the Councils, the Commission and the National Marine Fisheries Service (NOAA Fisheries).

Also as noted in the initial plan, observer program priorities are developed by the NEFSC and fulfilled by the Northeast Fisheries Observer Program. A separate list of bycatch priorities is developed annually by ACCSP to identify high priority fisheries to receive funding for observer coverage. ACCSP partners are asked each fall to outline projected needs two years into the future (i.e., the 2003 request asked for priorities for FY2005). Those requests are assembled for use at the annual meeting of the Bycatch Prioritization Committee, which occurs the following January/February. The Committee utilizes a bycatch prioritization matrix and the information submitted by the partners to develop a consensus on the top priorities for observer coverage. These priorities are used to allocate funds under an ACCSP Request for Proposals (RFP) issued the following May.

Table 1. Monitoring Priorities

FISHERY	TARGET SPECIES	GEAR	BYCATCH SPECIES
New England gillnet	gadoids, flatfish, dogfish	demersal gillnet	harbor porpoise, large cetaceans
Mid-Atlantic gillnet	monkfish, dogfish	gillnet	harbor porpoise, bottlenose dolphin, pilot whale, common dolphin, sea turtles
Georges Bank, Mid-Atlantic scallop dredge	sea scallop	dredge	sea turtles
Mid-Atlantic small mesh otter trawl	squid, mackerel, butterfish	otter trawl	common dolphin, pilot whale
Atlantic trap/pot*	lobster, crab, black sea bass	pots or traps	Right whale, large cetaceans, leatherback turtles

\*The National Working Group Report classified this gear as Lobster/crab trap. The RBAT expanded the definition to reflect the redesignation in the July 2003 List of Fisheries .



# **MONITORING PRIORITIES**

## **BYCATCH WORKSHOP RECOMMENDATIONS**

### **1. Explore the use of video monitoring systems**

Participants in the Data/Monitoring Session suggested that the NEFSC Observer Program should investigate the costs and feasibility of utilizing video monitoring for at-sea data collections. If implementation issues could be resolved, this approach could help to improve monitoring of under-sampled strata (i.e., small vessels), improve coverage and reduce bias, and increase sample sizes. The results of this investigation would be used to seek additional funding to implement such a system. Specific areas for investigation include:

- Exploring liability issues for vessels carrying video equipment;
- Developing software for species recognition;
- Testing video monitoring on observed trips to determine appropriate use of this technology;
- Testing placement and use on small vessels.

### **2. Suggestions to improve training of at-sea observers**

Participants in the Data/Monitoring Session suggested that the NEFSC Observer Program should explore several suggestions made by workshop participants to improve observer training. These include:

- Changing the sampling protocol so that fish intended for sale can be sampled/measured first and iced quickly to preserve fish quality;
- Improving observer training so that scales for age sampling can be obtained with less damage to fish;
- Incorporating volunteer industry vessels into the observer training program;
- Involving fishery participants in observer training programs.

### **3. Suggestions to improve retention of at-sea observers**

Participants in the Data/Monitoring Session suggested that staff from the NEFSC Observer Program should contact the staff of the Marine Recreational Fisheries Statistics Intercept Survey (MRFSS) to explore possibilities for some level of program integration. The participants felt that this might improve the ability of the Observer Program to retain experienced at-sea observers, which they identified as a current problem area for the program. Because both programs require similar skill sets (ability to accurately identify fish to species level, correctly weigh and measure specimens and calibrate equipment, follow specific sampling protocols, and communicate effectively with constituents), they suggested that there might be economies of scale associated with integration of training and/or program activities. Increased variety in activities could improve retention.

#### 4. Provide vessel owners with observer data

Participants in the Data/Monitoring Session suggested that the NEFSC Observer Program should explore ways the program could provide a copy of the observer report to the vessel owner shortly after the end of a trip. They indicated that this would give fishery participants more confidence in the accuracy of the data being collected by the program. However, the participants recognized that there are many operational details to work out to make this possible, and also recognized that any process to provide owners with this information would need to ensure the objectivity of the observer data. They suggested that the observer program could add a question about interest in receiving this information to a comment card that is currently being developed to solicit feedback from vessel owners. Among the issues they suggested for exploration:

- Determining the appropriate recipient (owner, operator, or both);
- Determining a format for providing this information;
- Determining a reasonable timeframe for providing such information, though industry participants requested that it be made available before the data was completed computerized and checked.

#### 5. Database Review

Participants in the Gear Technology Session expressed concern that there may be data of value that is not accessible to researchers. Their focus was on data concerning gear research and gear selectivity, and they suggested that a process should be undertaken to locate and conserve this data, and make it accessible to current researchers. They did not identify a specific management entity to carry out this suggestion.

This issue was also a monitoring priority in the initial Regional Bycatch Plan. The reiteration of this point by the Bycatch Workshop participants re-emphasizes this point. The initial Regional Bycatch Plan suggested that, if additional funding is available, funds should be allocated to conduct a database review. This review would identify and incorporate additional sources of data to profile bycatch in the region (the database equivalent of a literature review). Potential sources could include data collected by state researchers, data contained in protected species entanglement reports, and data from historic observer programs including those related to foreign fisheries joint venture activities. Anecdotal data sources should be incorporated in some way, at a minimum to identify possible bycatch issues that have not been witnessed on observed trips. These could include Vessel Trip Reports, the NERO inhouse "Fathoms Report," and potentially, discussions with industry members.

#### 6. Need for better estimates

Participants in the Science/Research Session identified the need for better estimates of various aspects of bycatch including those listed below. This was also identified as a priority in the Initial Regional Bycatch Plan, and was re-emphasized by the Bycatch Workshop participants,

who specifically identified the following information needs:

- Better estimates of discard rates, both by species and area;
- Better estimates of discard mortality;
- Better estimates of the mortality of fish that are not caught, but encounter gear or bycatch reduction devices.

The initial Regional Bycatch Plan included an objective for NEFSC staff in 2004 to use 2003 data to update available data to provide quantitative estimates of bycatch by gear and by fishery for use in addressing bycatch issues. This analysis will also identify data gaps and outline sampling programs that could address those gaps. Analyses of information derived from the NOAA Fisheries Northeast Observer Program and from the Northeast Vessel Trip Report System are underway at the NEFSC. This work entails updated analyses of the magnitude of bycatch in major fishery sectors with emphasis on the otter trawl, gill net and scallop fleets. The precision of the estimates is also being determined. NEFSC staff presented an overview of this work at the Bycatch Workshop, and the activity is continuing.

## **EXISTING MONITORING PRIORITIES**

### **1. Increased Observer Coverage**

NERO/NEFSC will continue to pursue funding to provide increased observer coverage for priority fisheries. The monitoring priorities identified in Table 1 will be updated as additional information becomes available in the future. Further increases in observer coverage are necessary to characterize bycatch for many fisheries so that management solutions can be devised, and so that stock assessments can be improved (bycatch is a major component of mortality for many species) and so that an assessment of bycatch in longline fisheries can be made to determine whether or not a seabird bycatch problem exists.

### **2. Establishment of a Process to Review/Update Quantitative Analyses**

The existing Northeast Regional Stock Assessment Workshop (SAW) process will be used to produce the best available estimates of bycatch. The estimation of bycatch has been addressed by the SAW on two levels: as a regular component of stock assessments and as a general issue associated with analysis of observer data and estimation of discards. Although the focus would shift from discards of target species to bycatch of multiple species by various fisheries and gear groups, a peer-review of data analysis and methodology would be appropriate as a future SAW topic, presumably tasked to the Methods Working Group. Terms of reference for the SAW topic can include identification and prioritization of future research.

Once a data analysis and estimation protocol is approved by a benchmark SAW review, the methods could be applied each year to update estimates of species bycatch by fishery, though not necessarily through the SAW process. SAW priorities are determined by the Northeast Regional Coordinating Council (NRCC), which is composed of the leadership of NERO,

NEFSC, the Councils, and the Commission. If the NRCC determined that a new benchmark review was needed as a result of changes in the database or availability of new methods or technology, it would be scheduled for a SAW. Such benchmark SAW reviews may require a wide range of expertise, including experience with protected species and habitat. Depending on the scope of the updates and the frequency of benchmark reviews, such work will require funding and staff. An inventory of research recommendations made by past SAWs has been compiled and is available for use as benchmarks are prepared, with nearly 100 recommendations related to bycatch.

Quantitative estimates of marine mammal bycatch are reviewed by the Atlantic Scientific Review Group, through a process established under the MMPA. A similar process is being established for sea turtles.

### 3. Paying for Sea Days

The NEFSC Economic Branch is currently reviewing observer data related to vessel costs and identifying data gaps that require supplemental information to be collected from commercial vessels. The study will use funding to pay for sea days on appropriate commercial vessels in order to collect the necessary supplemental information. A similar approach (paying for sea days) could be used in FY05 for a separate study to collect bycatch information, if additional funding is available.

## **FY04 MONITORING PRIORITIES COMPLETED**

### Increased Observer Coverage

In FY02, observer coverage was increased in the Northeast multispecies fishery. As a result of litigation, the NEFSC secured funding and increased the observer coverage in this fishery from <1% in trawl fisheries and 3-5% in gillnet fisheries to 5% in both. This coverage level is anticipated to continue at 5% as NOAA Fisheries has issued a Notice of Administrative Action noting that analysis at this level of coverage would provide sufficiently robust statistical data to evaluate bycatch and discards.

In addition, in the NEFSC Observer Program increased the amount of at-observer coverage provided on vessels using midwater trawls and purse seines to target Atlantic herring. This increase was enacted due to concerns about bycatch in these fisheries.

## RESEARCH PRIORITIES

The participants in the Science/Research Session of the Bycatch Workshop identified areas where research efforts, whether conducted by government agencies or independent researchers, should be focussed. Therefore, with a few exceptions, they did not associate any responsible management entity with the priorities identified. The participants did not revise the initial top priority stated in the initial Regional Bycatch Plan, which was gear modifications and the study of animal behavior (fish, marine mammals, sea turtles, sea birds) as it relates to the development of gear. The recommendations outlined below are not uniformly limited to the area of gear modification, but that area of research was emphasized by the Bycatch Workshop participants.

There are several processes in the Northeast Region that establish program priorities. Those processes can use the information in the Bycatch Plan to target their priorities, insofar as possible, toward the priority fisheries identified in Table 1. The NRCC, described previously, meets twice a year to incorporate the Council and Commission plans for developing or revising fishery management programs into the broader regional context and establish priorities for stock assessment updates and other related work. It is also the appropriate body to establish priorities for data collections to address data gaps in the context of other regional fishery management issues, and to set priorities for other bycatch related activities as well. Research priorities for protected species will continue to be established by Marine Mammal Take Reduction Teams and the Sea Turtle Strategy Team.

There are several regional programs that allocate funds or fishing quota to support research, and establish their own research priorities. These include the Northeast Consortium; the New England Fishery Management Council's Research Steering Committee, which establishes priorities for research to be funded through the NOAA Fisheries Cooperative Research Partners Initiative and the research set-aside program established within the Sea Scallop FMP; the Mid-Atlantic Fishery Management Council's Research Set Aside Committee, which establishes the priorities for research to be funded by commercial quota specifically set aside for research; and the ACCSP, which establishes priorities through its Bycatch Prioritization Committee.

Sea Grant programs in the Northeast and Mid-Atlantic regions have expressed an interest in establishing partnerships with the Northeast Region management entities to address bycatch. Sea Grant programs are housed within major state university systems and provide access to countless faculty and academic programs. Every two years, each program issues an RFP and research proposals are submitted that address issues identified in the strategic plan undergo rigorous technical review. Sea Grant funding has supported many gear/bycatch related projects and has allowed for the development of skills and technical expertise of the faculty of those universities. Many applied research projects dealing with bycatch are being conducted by Sea Grant supported projects or by Sea Grant personnel with leveraged funding. The Northeast and Mid-Atlantic Sea Grant Programs will consider these research priorities, and incorporate them into their calls for proposals.

## **BYCATCH WORKSHOP RECOMMENDATIONS**

### **1. Improved understanding of fish behavior**

Participants in the Science/Research Session identified the need to improve understanding of animal (fish, marine mammal, sea turtle, sea bird) behavior in terms of responses to fishing gears, responses to habitat, and other factors that affect temporal or spatial distribution. Better understanding of behavior patterns could assist in developing bycatch reduction devices. This issue was identified in the initial Regional Plan as the top priority for bycatch research in the Northeast Region, and the reiteration of this point by the Bycatch Workshop participants emphasizes this existing priority in the plan.

### **2. Improved habitat and ecosystem information**

Participants in both the Science/Research and Gear Technology Sessions stated that there was a need for more information relating habitat and ecosystem information to bycatch. The Science/Research Session stated that there is a need for data concerning the impacts of fishing activities on habitat. They noted specifically the need for high resolution, multi-beam seafloor mapping. Both the Science/Research and Gear Technology Sessions noted the need for better baseline information about natural ecosystem processes to determine the ecosystem effects of bycatch, as well as the ecosystem effects of bycatch reduction efforts focussed on single species.

### **3. Centralized data repository**

Participants in both the Science/Research Session and the Gear Technology Session identified the need for a centralized repository for scientific information and data. The Science/Research Session focussed on the need to capture data generated by the observer program and the cooperative research programs in the Northeast Region. The Gear Technology Session focussed on two points: (1) the need to capture data, irrespective of source, on fishing gear, selectivity, fish behavior, and gear impacts on habitat; and (2) the need to have access to the observer data in order to better identify discard rates by species and by area, and determine reasons for discard.

### **4. Long-term research funding and streamlined permit process**

Participants in the Science/Research Session identified the need for funding programs for research that provide funding for longer than a year at a time in order to plan long term studies. In addition, participants urged the NERO to continue its efforts to improve the efficiency of the process used to review applications for Exempted Fishing Permits necessary to conduct cooperative research projects when conducted by commercial vessels that will be selling their catch.

### **5. Utilize data from the fishing sector**

Participants in the Data/Monitoring Session identified the importance of incorporating more fishery-independent data into stock assessments and management decisions. They suggested this should include data on local weather conditions, bait/tackle/fuel sales, and other information provided by fishery participants. They suggested that referring to personal communications by fishery participants as “anecdotal” was disparaging, and they sought a more respectful way to characterize such information, which they believe should not be dismissed. They suggest that NEFSC staff should explore, with industry participation, ways in which such information could be provided. These discussions should include what data could be provided, who could provide such data, how much data would be necessary, and how often it would need to be provided.

#### 6. Gear Engineering Working Group

Rhode Island Sea Grant will continue, with S-K and Northeast Consortium funding, to coordinate the activities of an informal ad hoc gear engineering working group that involves most of the gear researchers currently active in the Northeast Region, including NERO and NEFSC staff. This working group is intended to establish a network of researchers who will share information, including training and educational material, through meetings and the internet; develop a resource sharing program (to share equipment such as cameras, scales, methods); and share research results. A workshop is planned for November 2004 on catch comparison experiments.

### **FY04 RESEARCH PRIORITIES COMPLETED**

#### Gear Engineering Working Group

The Gear Engineering Working Group mentioned above conducted activities in FY04 to establish a regional gear engineering working group, including a three-day workshop on design and analysis of gear selectivity experiments. The workshop was led by an international expert on gear selectivity, and was attended by 17 gear conservation engineers in the Northeast Region.

## MANAGEMENT PRIORITIES

It is hoped that the results of projects funded by NOAA Fisheries or supported through FMP research set-aside programs will produce results that will be used to develop measures to address bycatch in the management actions undertaken by the Councils, Commission and states. In addition, nearly all of the fishery management programs in the Northeast Region include a process for periodic review and adjustment of management measures through framework actions or annual specification processes, which may also incorporate the results of bycatch-related research. A list of bycatch-related research projects that were recently funded through the following NOAA Fisheries programs is provided in Appendix C: Saltonstall-Kennedy (S-K), Marine Fisheries Initiative (MARFIN), Cooperative Research Partners Initiative (CRPI), National Fish and Wildlife Foundation/NMFS Mini-Grant Program (NFWF/NMFS), and internal NMFS programs (NMFS). In addition, some research was supported by FMP research set-aside programs (RSA).

The Councils have included bycatch priorities in their RFPs for research to be supported by upcoming FMP research set-aside programs. The New England Council's RFP for sea scallop projects for the fishing year that begins March 2004 seeks demonstration projects to identify ways to reduce discard mortality, and identifies the evaluation of gear to reduce sea turtle and groundfish bycatch as a high priority.

The Mid-Atlantic Council's RFP soliciting projects to be supported by research quota set asides of summer flounder, scup, black sea bass, bluefish, *Loligo* squid, *Illex* squid, Atlantic mackerel, and/or butterfish for the fishing year that begins January 2005 solicits several types of projects to address bycatch, which are listed below.

- Studies of scallop gear modifications to reduce bycatch of summer flounder;
- Studies on incidental catch and discard mortality of dogfish in fisheries targeting other Mid-Atlantic species, with emphasis on gillnet, trawl, and hook-and-line gear;
- Summer flounder discard studies to distinguish regulatory discards from discards due to gear design;
- Discard studies in the *Loligo* and scup fisheries, including *Loligo* gear modifications to reduce bycatch of scup and other species;
- Improved estimates of recreational discards in the summer flounder, scup, black sea bass, and bluefish fisheries;
- Measures to decrease discards associated with increases in minimum fish size;
- Mesh selectivity studies for summer flounder, scup, squid, black sea bass and butterfish;
- Evaluation of pot gear escape vent sizes and shapes for black sea bass and scup;
- Estimation of mortality of black sea bass left in pots during the closed season;
- Studies of bluefish, summer flounder, scup, and black sea bass hooking mortality by size of fish;
- Data to better characterize length composition of summer flounder, scup, and black sea bass discards;



--Development of optimum sampling levels to estimate discards of summer flounder, scup, and black sea bass;

## **BYCATCH WORKSHOP RECOMMENDATIONS**

### **1. Improving data**

The participants in the Management Session reiterated the need for better data on bycatch of fish, marine mammals, sea turtles and sea birds. They identified the need for data on the volume of discard by gear, species and area, as well as data on the research for discarding (regulatory, economic, high grading, etc). Better information would be used to develop more effective management measures. The participants emphasized the need to improve collaboration with fishery participants in order to improve the quality of the data they provide through the data collection system. They suggested that the management entities in the region should explore ways to better communicate to fishery constituents the link between better data and better management programs.

### **2. Consideration of Programs to Create Incentives to Reduce Bycatch**

Participants in the Management Session identified the need for management entities to develop incentives to reduce or eliminate bycatch. They suggested that management programs such as setting total harvest limits that account for all catch of a species (retained and bycatch), and that require fishery closures when those limits are attained, would provide an incentive for industry to adopt fishing practices that avoid bycatch. They noted that such programs have been successful in other regions. The session participants also suggested that management entities should explore strategies that reward harvesters for using gears that reduce bycatch. For example, programs could be established to allow higher trip limits or a greater number of fishing days-at-sea if harvesters used specific net configurations, hook sizes or trap designs.

This issue was identified in the initial Regional Plan as a management priority in the Northeast Region, and the reiteration of this point by the Bycatch Workshop participants emphasizes this point. The initial plan included a recommendation that management entities should encourage the consideration of harvest rights arrangements as a way to resolve bycatch as well as other management problems. The RBAT noted that management programs that establish harvest rights, such as Individual Transferable Quotas and harvest cooperatives, can also result in reduced bycatch. As an example, the ability to purchase or lease harvest shares can be used by harvesters to reduce their regulatory discards. As another example, harvesters joined by a contract in harvest cooperatives that fish under management programs that establish bycatch quotas for some species have demonstrated that they will share information to avoid bycatch in order to keep from attaining the bycatch quota, and having the directed fishery closed as a result.

### **3. Evaluate effects of overcapacity**

The participants in the Management Session cited the current over-capacity of the fishing fleet in the Northeast Region as one of the major causes of bycatch. For example, in quota-managed fisheries that are overcapacity, low trip limits are often established to prolong the fishing season. Such trip limits may, however, result in regulatory discards. They suggest that the management entities in the region should explore ways to bring industry groups together to develop approaches to reduce the capacity in the region. Such activities could be carried out cooperatively by some or all of the management entities, and Sea Grant institutions could serve as partners for such activities. Ultimately management measures would need to be developed through the Council process for federal fisheries and through the Commission or states for state-waters fisheries.

#### 4. Establish Council Bycatch committees

The participants in the Management Session suggested that the Councils should each establish standing Bycatch Committees to consider bycatch issues in the same manner that Take Reduction Teams consider marine mammal bycatch issues, in that they would recommend management measures to address bycatch. These Committees would be composed of representatives from the fisheries, fishery managers, scientists, and gear experts.

These Committees could also evaluate potential programs to address bycatch. For instance, the participants in this session suggested that the potential benefits of programs that require 100% catch retention should be evaluated. Such programs would require all catch to be landed, weighed, and measured, and would provide better information about catch composition.

#### 5. Gear expertise on Council Plan Development Teams (PDTs)

The participants in the Gear Technology Session suggested that there needs to be a better mechanism to incorporate the results of gear research projects into fishery management actions. They proposed that this should be done by including members knowledgeable about fishing gear and fishing gear research on working bodies such as the PDTs established by the New England Council. The PDTs conduct analyses for the various fishery management plan species; the Mid-Atlantic Council and the Commission use staff and other bodies to conduct similar work.

#### 6. Peer review of gear research

The participants in the Gear Technology Session suggested that a process is needed to ensure that gear research proposals and results are peer reviewed before they are transmitted to technical bodies such as the PDTs. This suggestion should be explored by the management entities in the Northeast Region to determine if it is feasible, and if so, how it would best be implemented.

#### 7. Daily vessel reporting to identify bycatch hotspots

The participants in the Management Session suggested that management entities should explore the use of real time reporting for some or all fisheries in order to identify areas where bycatch is high. Such areas could then be avoided by vessels, reducing bycatch. The exploratory work on this idea would have to consider whether it would be mandatory for vessels to avoid such areas or voluntary. Vessel Monitoring Systems (VMS) present the most obvious tool for real time data collections, but investigation into this idea may identify other options.

## **EXISTING MANAGEMENT PRIORITIES**

### **Management Activities to Address Bycatch**

The Councils will be working on amendments to several fishery management plans during FY05. While some amendments (those identified by an asterisk) will address concerns that have been raised about bycatch, all of these actions will be required to consider bycatch along with the other requirements of the MSA, MMPA and ESA. Some of these fisheries are also managed in state waters by the Commission under Interstate Fishery Management Plans (Atlantic herring, spiny dogfish, American lobster), and it is anticipated that those plans will also incorporate appropriate management measures to address bycatch as they are identified. Commission action to manage American lobster may require NOAA Fisheries action under the Atlantic Coastal Fisheries Cooperative Management Act (ACFCMA). NMFS staff from the NEFSC and NERO will participate in the Council processes to develop management alternatives for consideration; will review management actions for species interactions that require action under the MMPA or ESA; and will carry out management actions required for American lobster under ACFCMA. The following activities have been included in tentative workplans, though staffing levels may not be sufficient to allow all activities to be conducted within the timeframe:

- \*Multispecies framework 40B, that would establish Special Area Access Programs (SAPs) to authorize fishing activities that result in low catches of species requiring conservation;

- \*Atlantic Herring Amendment 1 to evaluate a number of modifications to the management program including the possible establishment of limited entry;

- Monkfish Amendment 2 to evaluate a number of modifications to the management program;

- Whiting Amendment to evaluate a number of modifications to the management program including the possible establishment of limited entry;

- Hagfish FMP, to consider establishing management for the Atlantic hagfish fishery, which is presently unmanaged;

- \*Atlantic mackerel, squid, butterflyfish Amendment 9 to consider permanently extending the *Illex* squid limited entry program and to evaluate bycatch and fishing gear impacts on Essential Fish Habitat;

- Commission Addenda to the American Lobster IFMP, to establish management measures to meet area management goals; NOAA Fisheries actions under ACFCMA as appropriate.

## **FY04 MANAGEMENT PRIORITIES COMPLETED**

The Councils worked on amendments to several fishery management plans during FY04, and some (those identified by an asterisk) specifically addressed concerns that have been raised about bycatch. However, the other actions required the Councils to consider bycatch along with the other requirements of the MSA, MMPA and ESA. Some of these fisheries are also managed in state waters by the Commission under Interstate Fishery Management Plans (Atlantic herring, spiny dogfish, American lobster), and those plans will also incorporate appropriate management measures to address bycatch as they are identified.

\*Amendment 13 to the Multispecies FMP requires current fishing levels to be reduced for some stocks such as Georges Bank cod, while fishing could be increased for other species that are often caught on the same fishing trips, such as Georges Bank haddock. To address this problem, Amendment 13 specifies fishing days-at-sea (DAS) as Category A days and Category B days. The total number of A days would be calculated to result in a level of fishing effort that would achieve fishing mortality reduction targets for all multispecies stocks. The remaining B days could only be used in well-defined ways that would result in little or no bycatch of fish from the stocks that need the most protection. In order for harvesters to be able to utilize B days, it would be necessary to identify where and how they could utilize the B days without unacceptable bycatch. The Council expects that this measure would create a stronger incentive for harvesters to develop methods to avoid bycatch of species in need of conservation than would restrictive possession limits alone.

\*Amendment 10 to the Sea Scallop FMP established a management program intended to focus scallop fishing on larger, high-valued scallops and reduce bycatch of smaller scallops, allowing them to grow to a more valuable size.

\*Sea Scallop and Multispecies Frameworks 16/39 to authorize sea scallop fishing in areas closed to conserve multispecies;

\*Multispecies framework action 40A, if approved, that would establish Special Area Access Programs (SAPs) to authorize fishing activities that result in low catches of species requiring conservation;

\*Skate FMP baseline review to determine if recent management actions in other fisheries have resulted in any impacts on skates that require management;

Commission Addenda to the American Lobster IFMP, to establish management measures to meet area management goals; NOAA Fisheries actions under ACFCMA as appropriate.

## **EDUCATION/OUTREACH PRIORITIES**

### **BYCATCH WORKSHOP RECOMMENDATIONS**

#### **1. Improve NEFSC Communication with Constituents**

Participants in both the Data/Monitoring Session and the Gear Technology Session suggested that improved communication was needed between NEFSC and constituents in a number of areas relating to the Observer Program and the use of data in stock assessments:

Participants suggested that a better understanding of data collections, stock assessments, and their use in the management process would result in stronger constituent support of data collection efforts and the resultant management programs. If constituents understand the need for the data, it should lead to increased cooperation and participation in data collection programs.

The Observer Program should establish fishing group liaisons to improve information sharing;

The Observer Program should develop an outreach component to provide better information to the public and the industry about formulas and methodologies for estimating bycatch, sampling protocols including stratification and sampling strategy, and information about types of bias.

The training program for at-sea observers should include a component that enables them to communicate clearly with fishery participants about at-sea sampling protocols and the vessel selection process for observer placement.

#### **2. Improve NERO Communication with Constituents.**

Participants in the Data/Monitoring Session suggested that the NERO should improve outreach to educate constituents about how bycatch estimates are used for management. As noted in the previous recommendation, the participants suggested that a better understanding of data collections, stock assessments, and their use in management would result in stronger constituent support of both management and data collection efforts. Several specific outreach suggestions were made, and all are identified below. The NERO notes that in FY04 it achieved one of the objectives in the initial Bycatch Plan when it hired an Outreach Coordinator, Marla Trollan, who has already initiated several of these actions:

Increase industry involvement by developing a network/database of stakeholders. NERO notes that while it needs to continue to expand its outreach efforts, in FY04 it established a database of ~3,000 individuals and organizations to use for outreach efforts.

Establish better contacts with media, including fishing associations, outdoor writers and trade publications, to provide better notification of upcoming events NERO is implementing this suggestion.

Involve Fisheries Statistics Office field staff (port agents) as outreach

representatives in order to improve and personalize communication. NERO is exploring this suggestion.

The participants in the Gear Technology Session suggested that NOAA Fisheries and the other management entities consider establishing three specific outreach tools. The Sea Grant Program representatives noted that their programs are well suited to conduct educational activities such as gear training for participants in the management process. They noted that sea grant has the capability to carry out educational training courses, seminars and workshops on various topics, and could develop materials and incorporate fishery participants into such training. The suggestions are outlined below:

A quarterly NERO newsletter that would be sent to every federal permit holder;  
A program that would require federal permit holders to acquire professional training credits each year by participating in specific activities;  
Ways that all of the participants in the management process could improve their understanding of fishing operations and gear. They suggested this could be done through classroom programs as well as “hands on” programs such as the Marine Research Education Program, currently operating at University of New Hampshire under a grant from the Northeast Consortium. They noted there could be other opportunities through regional grant programs.

## **EXISTING EDUCATION/OUTREACH PRIORITIES**

### **1. Outreach Staff for Bycatch**

If funding is available, NERO would establish two new positions to focus on fishery bycatch issues. The first (Bycatch Outreach Specialist, Band II/III) would serve as a focal point to coordinate regional efforts to address bycatch. The second (Bycatch Gear Specialist, Band II/III) would focus on working with industry to develop gear solutions to bycatch problems. The gear specialist would work with constituents to develop new gear solutions, and would conduct education and outreach activities when new gears were developed and implemented.

### **2. Annual Bycatch Forum**

If annual funding of \$8,000 is available, NERO would sponsor an annual Bycatch Forum. This would be a smaller event than the Bycatch Workshop, and would be designed to review all of the bycatch-related work conducted over the year by NOAA Fisheries or any of the other interested parties in the region. The results of research projects funded by a wide range of sources in the region would be presented and reviewed, allowing information to be shared widely with harvesters, managers and researchers. Progress would be evaluated, results would be publicized, and problems would be debated. This Bycatch Forum would become an annual event, in order to maximize the sharing of knowledge, build on successes, and move forward to solve bycatch problems. This would provide an annual opportunity for members of the Gear Engineering Working Group to share information, and for constituents to identify specific topics

that could be addressed in bycatch research. In addition to allowing researchers and managers to share current data and research results, this would provide an opportunity for commercial and recreational harvesters to share their field observations, their ideas on bycatch reduction strategies and research initiatives, and their assessment of potential economic and social impacts associated with various bycatch reduction strategies. Environmental organizations would be provided with an opportunity to receive first hand information on the extent of the bycatch problem and progress being made to reduce it, as well as an opportunity to work with managers and harvesters in finding solutions.

## **FY04 EDUCATION/OUTREACH PRIORITIES COMPLETED**

### **1. Bycatch Workshop**

Funding of \$40,000 was allocated for the Regional Bycatch Workshop held in June 29 - July 1, 2004. The Bycatch Workshop was attended by ~200 participants from NOAA Fisheries, the Councils, the Commission, the ACCSP, Sea Grant Programs, the states, commercial and recreational fishing sectors, environmental organizations, academics, and members of take reduction teams established to consider sea turtle and marine mammal issues.

The NOAA Fisheries Regional Administrator, Patricia Kurkul, provided a brief summary of some common themes that ran through the four sessions at the Bycatch Workshop, and those are included in the Introduction. The complete Bycatch Workshop proceedings are posted on the NERO website at: <http://www.nero.noaa.gov/nero/hotnews/proceedings.pdf>.

### **2. Outreach Coordinator**

The Northeast Regional Office hired an Outreach Coordinator, Marla Trollan, who will, among other activities, work on bycatch related outreach activities. She served on the Bycatch Workshop Coordinating Committee and conducted the outreach and publicity for the Bycatch Workshop.

### **3. Gear Engineering Outreach**

The Rhode Island Sea Grant Gear Engineering Working Group provided financial support for industry members to attend the Bycatch Workshop, and established a website that presents background material on gear conservation engineering, gear types, experts, events and references: [http://seagrants.gso.uri.edu/reg\\_fish/gear/index.html](http://seagrants.gso.uri.edu/reg_fish/gear/index.html).

## **APPENDIX A**

### **Members of the Regional Bycatch Assessment Team (RBAT)**

Steve Cadrin (NMFS, NEFSC)  
Kathy Castro (RI Sea Grant)  
Bob Beal (ASMFC)  
Peter Christopher (NMFS, NERO)  
Steve Edwards (NMFS, NEFSC)  
Michael Fogarty (NMFS, NEFSC)  
Hannah Goodale (NMFS, NERO)  
Brian Hopper (NMFS, NERO)  
Chris Kellogg (NEFMC)  
Deirdre Kimball (NMFS, NERO)  
Lisa Kline (ASMFC)  
Lynn Lankshear (NMFS, NERO)  
Earl Meredith (NMFS, NERO)  
Jose Montanez (MAFMC)  
Chris Moore (MAFMC)  
Dan Morris (NMFS, NERO)  
Maury Osborne (ACCSP)  
Debra Palka (NMFS, NEFSC)  
Greg Power (NMFS, NERO)  
Amy Van Atten (NMFS, NEFSC)  
John Witzig (NMFS, NERO)  
Patricia Yoos (NMFS, NEFSC)

### **Members of the Bycatch Workshop Coordinating Committee**

Bob Beal, ASMFC  
Kathy Castro, RI Sea Grant  
Patricia Fiorelli, NEFMC  
Michael Fogarty, NMFS, NEFSC  
Hannah Goodale, NMFS, NERO  
Chris Kellogg, NEFMC  
Chris Moore, MAFMC  
Marla Trollan, NMFS, NERO



## Appendix B Existing Management Measures to Address Bycatch

FISHERY	DIRECT MEASURES	INDIRECT MEASURES
Northeast multispecies	mesh size restrictions; pair-trawl prohibition; 5% regulated species bycatch cap when fishing outside of DAS; raised footrope trawl; prohibition on brush sweep; inshore restricted roller gear; MMPA: pingers on gillnets; neutrally buoyant groundlines in some areas; area/time closures	effort controls (limited entry, DAS); closure areas; cod and haddock landings limits
Northern shrimp	finfish excluder	seasonal closures
Whiting, small mesh multispecies	raised footrope trawl required seasonally; grate required seasonally in Maine waters	incentives for use of large mesh in return for increased trip limits; small incidental landings can be made by non-directed vessels to reduce regulatory discard
Monkfish	minimum mesh requirement; MMPA: pingers at certain times/areas; weak links; neutrally buoyant groundlines in specific areas; specific area/time closures; rolling closures for sea turtles from NC north to VA in spring	limited entry and DAS restrictions; trip limits; minimum fish sizes
Sea scallop	restriction on use of trawl gear to reduce bycatch small scallops; minimum ring size; minimum mesh requirement for twine top (8" in most areas; 10" in reopened areas)	limited entry and DAS restrictions; limited possession by open access vessels; 7-man crew restriction; small dredge program;
Summer flounder	minimum mesh requirement; ESA: TEDS required in NC/VA	Limited entry; commercial quota with fishery closure when attained
Scup	minimum mesh requirement; seasonal Gear Restricted Area to minimize bycatch of juvenile scup in small mesh gear; escape vents in pots	Limited entry; commercial quota with fishery closure when attained
Black sea bass	minimum mesh size; escape vents in pots	Limited entry, commercial quota with fishery closure when attained
Deepsea red crab	non-trap gear prohibited in directed fishery	effort controls (limited entry, DAS)
Atlantic salmon	no possession allowed	
Tilefish	gear restricted to longline in directed fishery	limited entry; commercial quota with fishery closure when attained
Surfclam & ocean quahog		ITQs
Maine mahogany quahog	gear restricted by State of Maine	commercial quota with fishery closure when attained
Atlantic herring		TACs by fishing area, directed fishery closure when attained
Ilex & Loligo squid, Atlantic mackerel, butterfish	minimum mesh size for Loligo	limited entry fishery; commercial quota with directed fishery closure when attained

Spiny dogfish	MMPA: pingers required at certain times/areas; weak links in all gear; neutrally buoyant groundlines in some areas; seasonal area closures	Trip limits preclude directed fishery in EEZ; commercial quota with fishery closure when attained
Skates		effort controls in other fisheries (scallop multispecies, monkfish)

## APPENDIX C

### LIST OF NOAA FISHERIES FUNDED BYCATCH-RELATED RESEARCH PROJECTS (Funding source indicated in parentheses)

Manomet Center for Conservation Studies, “Relating Fish Shape to Mesh Size: How Morphometric Variability Affects Trawl Net Selectivity in the Gulf of Maine.” To collect morphometric measurements of key groundfish species during standard fishing operations on commercial fishing vessels in the Gulf of Maine. A simple model will be formulated to estimate the mesh size and configuration through which commercial fish species of any size will be most likely to escape. The model will enable managers and the fishing industry to predict potential retention rates of major commercial fish species for a range of mesh sizes and configurations. (S-K)

Massachusetts Division of Marine Fisheries, “Further Testing of Cod Avoiding Trawl Net Designs.” To further verify the effectiveness of two cod-avoiding trawl net designs, the so-called “Ribas” and “Topless trawls,” using larger versions of the designs and including night-time testing. (S-K)

New England Aquarium, “Juvenile Bycatch and Survival Assessment of Spiny Dogfish (*Squalus acanthias*) in a Western Atlantic Trawl Fishery.” To conduct the first survivability study on elasmobranchs and more specifically, *Squalus acanthias*, that includes stress measurements. Investigate short term and long term survivorship following trawl exposure and discard. (S-K)

Manomet Center for Conservation Studies, “Development of Cod Excluder Devices for Northwest Atlantic Trawl Fisheries.” To test the effectiveness of a new bycatch reduction device (Ex-It) in reducing the inadvertent catch of undersized fish in the northwest Atlantic. The study will focus primarily on retention of juvenile and undersized cod. This will be an international venture involving the Manomet Center for Conservation Sciences, Massachusetts Division of Marine Fisheries, Maine Department of Marine Resources, Canadian Department of Fisheries and Oceans, commercial fishermen, and industry input from Nordurnet, Iceland. Recommendations on the effectiveness of the bycatch reduction device will be made available to fisheries managers in both the USA and Canada. (S-K)

University of Rhode Island, “Effects of Increasing Mesh Size in the Multispecies Fisheries of New England Waters: Applied Research and Outreach.” To conduct mesh size selectivity studies aboard a commercial fishing vessel and integrate the results of the study into yield-per-recruit (YPR) and spawning-stock biomass-per-recruit (SSBPR) models evaluating the effects of incrementally increasing mesh sizes. (S-K)

New England Aquarium, “Increasing Juvenile Cod Bycatch Survival in a Northwest Atlantic Longline Fishery.” To: (1) augment the survival data already collected on juvenile cod bycatch caught by demersal longlines, (2) quantify mitigated survival of juvenile cod bycatch caught by demersal longlines when treated by immersion in solutions of potassium chloride, (3) quantify the degree of physiological stress experienced by juvenile cod bycatch caught by demersal longlines through the analysis of biological parameters in the blood, and (4) continue

to solicit advice from longline fishermen relative to increasing the survival of groundfish discards. (S-K)

New England Aquarium Corporation, “Increasing Survival of Juvenile Atlantic Cod (*Gadus morhua*) and Haddock (*Melanogrammus aeglefinus*) in the Northwest Atlantic Demersal Longline Fishery.” To build upon the selectivity work already conducted and investigate how different hauling strategies might affect wound size and juvenile groundfish survivability. Preliminary survival statistics from current longline work suggest that survival of juvenile bycatch is correlated to hooking wound magnitude and that effective selectivity against juveniles can be accomplished using modified circle hooks. (S-K)

NOAA Fisheries, Northeast Fisheries Science Center and Manomet Center for Conservation Science, “*Loligo* gear modification study.” To conduct a quantitative assessment of the effectiveness of a large-mesh cylinder in reducing scup bycatch in the small mesh fishery targeting *Loligo* squid. (MARFIN)

University of New Hampshire, “Soft Species Separation System for the New England Multispecies Fishery.” (CRPI)

Manomet Center for Conservation Science, “A Collaborative Program to Assess Possible Temporal Access to Closed Area II: Targeting Yellowtail Flounder Without Significant Bycatch of Cod and Haddock.” (CRPI)

Manomet Center for Conservation Science, F/V’s North Star, Lady Jane, Christopher Andrew, “Improving the Selective Efficiency of Trawl Gear with Escape Windows and Visual Stimuli.” (CRPI)

Captain John Raymond/Manomet Center for Conservation Science, “A Collaborative Program to test the use of a Cod/Haddock Separator Panel in Trawl Nets.” (CRPI)

Manomet Center for Conservation Science partnering with the Gulf of Maine Aquarium, “Assessing the Bycatch of Groundfish in the Monkfish Fishery.” (CRPI)

University of Rhode Island, F/V Grandville Davis, and RIDEM, “Characterization of Bycatch Reduction from Codend Mesh Size Increases in the Directed Scup Bottom Trawl Fishery.” (CRPI)

F/V Ocean Reporter and Allen Michael and Associates, “Development of Video Techniques for Bycatch Reduction Studies.” (CRPI)

Virginia Institute of Marine Science, “Industry Trials of a Modified Sea Scallop Dredge to Minimize the Catch of Sea Turtles.” (RSA)

“Zap Link.” To develop and test a device that serves as a releasable link on the ground lines of lobster trawls. The link will part if a whale catches the ground line in its mouth, but will still allow normal operations of trawls. (USFWF/NMFS)

“Glow-in-the-Dark Rope of Controllable Stiffness.” To test the hypothesis that whales will detect and avoid glowing ropes, preventing entanglement in line that does not bend. (USFWF/NMFS)

“Investigation of Alternative Ground Lines.” To replace lobster/black sea bass traps that use ground lines with sinking and neutrally buoyant line to reduce entanglements in Management Area 5. Quarterly samples will be taken and workshops with industry will be conducted. (USFWF/NMFS)

“Lobster Gear Profile Separation Testing.” To identify what part of the trap line profile

separates, at what tension, and what portion remains with a series of gear tests. Twenty-four trials will be conducted using several gear combinations used to harvest lobster. (USFWS/NMFS)

“Using Microchip Technology to Identify Fishing Lines.” To embed scanable microchips into various fishing lines to identify the fishery using the line responsible for the entanglement. (USFWS/NMFS)

“Design of Line Cutter to Prevent Entanglements.” To develop a knotless line cutter and adapt it to other line tensions as required by other fisheries to prevent entanglements. (USFWS/NMFS)

“Ghost Gear Removal.” To remove fishing gear debris to eliminate marine mammal entanglement on Cashes Ledge. A disposal system will be developed and an ongoing effort to ensure the area remains free of debris. (USFWS/NMFS)

State of Maine, “Maine Cooperative Management Plan for Large Whales and Sea Turtles.” To maintain and expand Maine’s sighting/surveillance and disentangling networks, investigate and implement gear modifications and fishing strategies to reduce mortality of right whales and other large whales. (USFWS/NMFS)

Commonwealth of Massachusetts, “Massachusetts Right Whale Conservation Plan.” To maintain and improve right whale programs in Massachusetts and undertake new initiatives for take reductions. The project will continue a well implemented survey off the Massachusetts coast. (USFWS/NMFS)

“Underwater Video Project.” To study buoy line and ground line behaviors where the buoy lines and ground lines are constructed of various combinations of sink, float and neutrally buoyant line. (NMFS)

“Development of Non-Floating Line.” To develop line that can be used in the fixed gear fisheries on all bottom types that is more abrasion resistant than non-floating lines currently being used. (NMFS)

“Development of a Float Line.” To develop a line that has an 1,100 lb breaking strength that can be used by the gillnet fishery in the head rope of a net panel. (NMFS)

“Develop Sighting Skills.” Outreach and education to develop fisher skills to sight and identify whales and communicate through the sightings call system to prevent the entanglement of sighted animals (NMFS).